

***Peripsocus* Species of the *Alboguttatus* Group
(Psocoptera: Peripsocidae)**

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Abstract: The *alboguttatus* group of the genus *Peripsocus* is defined on the basis of genitalic features of both sexes and forewing-marking pattern. Ten species are included, seven of which are described as new and are named as follows: *P.alachuae*, *P.australis*, *P.maculosus*, *P.minimus*, *P.monticola*, *P.potosi*, *P.teutonicus*. The forewing-marking pattern common, with minor modifications, to most species of the group is departed from by *P.monticola* n.sp., but this species is obviously very close to another included member, *P.australis* n.sp., as shown by genitalic features of both sexes. The taxonomic treatment is based on examination of 543 adult specimens. The location of the major types of each new species is mentioned in its description. A neotype of *P.madescens* Walsh is designated. A brief discussion of probable phylogenetic relationships within the species group is included. The *alboguttatus* group is represented in eastern United States by five species, one of which enters southeastern Canada. *P.alboguttatus* Dalman occurs throughout Europe as well as in North America. In Mexico there are two species in the group, one of which ranges south into northern South America and occurs on Trinidad, Puerto Rico, and Jamaica in the West Indies. Another species is known from Jamaica. Two species are known from southern Brazil, and one occurs in West Africa.

The genus *Peripsocus* is a cosmopolitan genus in which 80 species are now known including those here described as new. Thornton and Wong (1967) presented ideas on possible relationships of 15 species of the Pacific Basin, but to date no classification of the world fauna of this genus has been made. The species group set out in the present paper may have to be modified when such a classification is made.

The *alboguttatus* group may be characterized as follows:

1. Male clunium (fused abdominal terga 8-10) adorned with a single process projecting from its posterior margin on the dorsal mid-line.
2. Male radular sclerotizations in the form of a fork sclerite (Pearman, 1951).
3. Male with costal vein thickened for almost its entire length from wing base to base of pterostigma.
4. Male phallosome of approximately equal width throughout most of its length, not decidedly narrower in its anterior half.
5. Female subgenital plate with its apical process rounded posteriorly, showing no trace of indentation.

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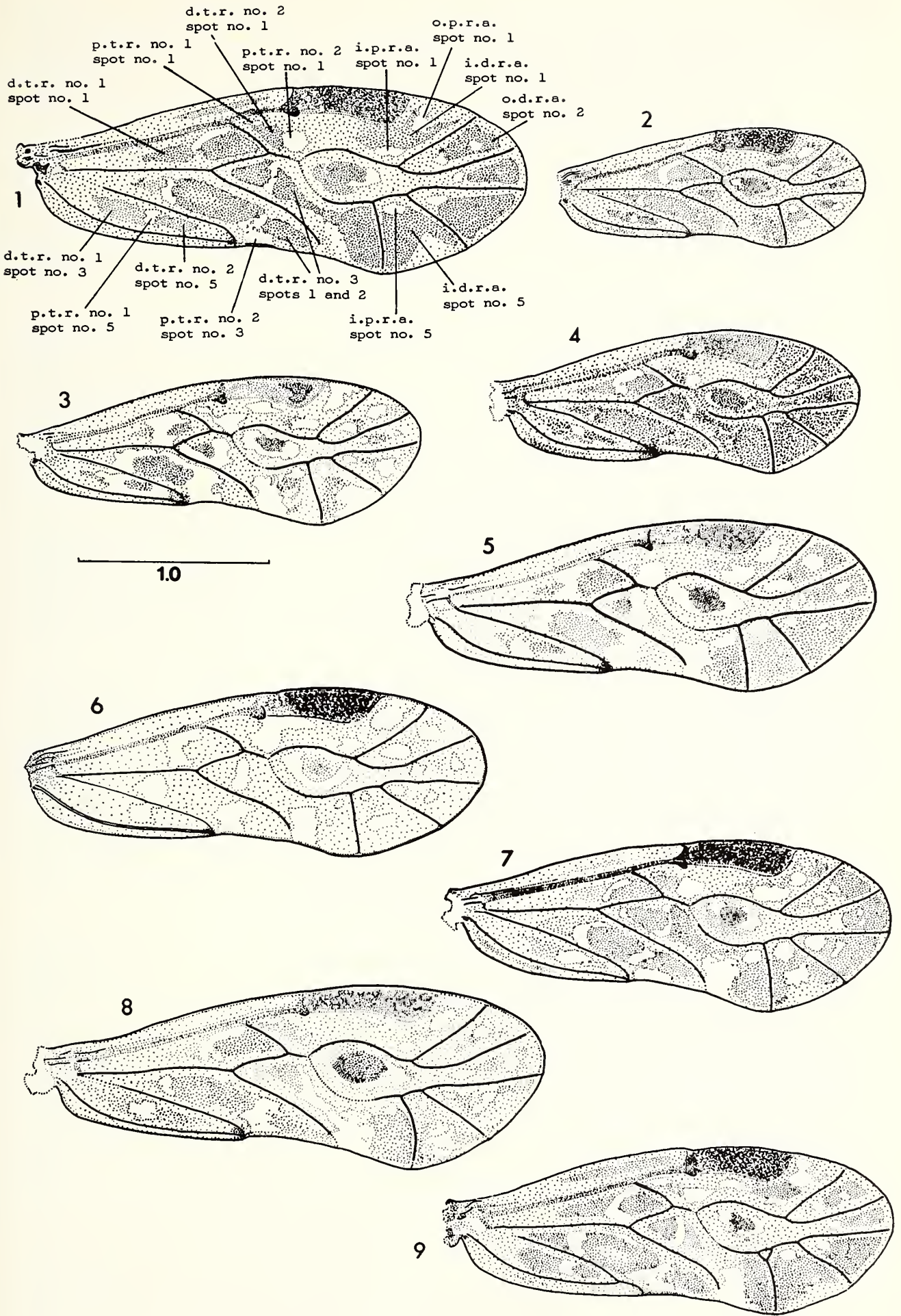
6. The complex forewing markings adhere closely to a pattern summarized in the following outline (see Fig. 1):

- I. Transverse rows of spots: rows oriented transversely (on diagonals) to long axis of wing.
 - A. Dark transverse rows
 1. First dark transverse row (Fig. 1, d.t.r. no. 1): spot no. 1 in middle of cell R; spot no. 2 in basal third of cell Cu₁; spot no. 3 in middle of cell Cu₂.
 2. Second dark transverse row (Fig. 1, d.t.r. no. 2): spot no. 1 in cell R₁ near base of cell; spot no. 2 in distal end of cell R; spot no. 3 in cell M₃ near base of cell; spot no. 4 in middle of cell Cu₁; spot no. 5 in cell Cu₂ distad of middle.
 3. Third dark transverse row (Fig. 1, d.t.r. no. 3): spot no. 1 in middle of cell M₃; spot no. 2 in distal end of cell Cu₁.
 - B. Pale transverse rows
 1. First pale transverse row (Fig. 1, p.t.r. no. 1): spot no. 1 in base of cell R₁; spot no. 2 near distal end of cell R between the two dark spots; spot no. 3 in basal end of cell M₃; spot no. 4 just basad of middle of cell Cu₁ between the two dark spots; spot no. 5 toward distal end of cell Cu₂ between the two dark spots.
 2. Second pale transverse row (Fig. 1, p.t.r. no. 2): spot no. 1 in cell R₁ near base, distad of dark spot no. 1 of second transverse row; spot no. 2 in cell M₃ between the dark spots of second and third transverse rows; spot no. 3 in cell Cu₁ immediately above nodus.
- II. Radial series of spots: spots arranged in arcs in distal third of wing, the arcs approximately centered on a prominent dark spot in base of cell R₅. These are absent in *P. monticola* n.sp.
 - A. Pale radial series
 1. Inner pale radial arc (Fig. 1, i.p.r.a.): spot no. 1 in cell R₁ below distal end of pterostigma; spot no. 2 in cell R₃ near base of cell; spot no. 3 in cell R₅ distad of middle of cell; spot no. 4 in cell M₁ near base of cell; spot no. 5 in cell M₂ near base of cell; spot no. 6 in cell M₃ near branching of vein M₃ from median stem.
 2. Outer pale radial arc (Fig. 1, o.p.r.a.): each spot distad of the spot of inner arc, but no spot exists corresponding to spot no. 6 of inner arc.
 - B. Dark radial series
 1. Inner dark radial arc (Fig. 1, i.d.r.a.): five spots between the spots of the two pale arcs. A large dark spot distad of spot no. 6 of the inner pale radial arc is spot no. 6 of this arc.
 2. Outer dark radial arc (Fig. 1, o.d.r.a.): series of five spots each distad to a spot of the outer pale radial arc. Spots of the inner and outer dark radial arcs may surround spots of the outer pale radial arc and thus coalesc.

Diagnosed as above, the *alboguttatus* group includes the following nine species:

→

FIGS. 1-9. Forewings of *Peripsocus alboguttatus* group species, all drawn at scale shown (scale in mm.). Fig. 1. *P. maculosus* n.sp. ♀, large specimen from Quebec. Abbreviations explained in text. Fig. 2. *P. maculosus* n.sp. ♀, small specimen from Virginia. Fig. 3. *P. alachuae* n.sp. ♀. Fig. 4. *P. minimus* n.sp. ♀. Fig. 5. *P. potosi* n.sp. ♀. Fig. 6. *P. teutonicus* n.sp. ♀. Fig. 7. *P. alboguttatus* Dalman ♀ from Maryland. Fig. 8. *P. alboguttatus* Dalman ♀ from British Columbia. Fig. 9. *P. madescens* Walsh ♀.



P. alachuae n.sp., *P. alboguttatus* Dalman, *P. australis* n.sp., *P. balli* Badonnel (but probably not the male tentatively assigned to that species by Badonnel in 1969. See discussion under that species), *P. maculosus* n.sp., *P. madescens* Walsh, *P. minimus* n.sp., *P. monticola* n.sp. (although forewing markings depart considerably from those described above), *P. potosi* n.sp., and *P. teutonicus* n.sp.

Measurements (Table 1) were taken on whole specimens mounted temporarily in glycerine on a well slide. A filar micrometer was used, giving a micrometer unit of 2.63μ for forewing and posterior tibial lengths, and of 1μ for all other measurements.

Epiproctal and paraproctal characters do not differ interspecifically enough to warrant their description for each species. The number of trichobothria in the sensory cushion of the female paraproct varies from 16 to 25. Most of the species occupy either the middle or almost all of this range, but *P. maculosus*, with 19 to 22 for six individuals counted, is toward the low end, and *P. potosi*, with 16 to 19 for three individuals counted, is further toward that end. Three shapes of female epiproct are seen. One decidedly tapering from a broad base (Fig. 45) occurs in *P. alachuae*, *P. alboguttatus*, *P. maculosus*, *P. madescens*, and *P. minimus*. A short, broad epiproct is seen in *P. potosi* and *P. teutonicus* (Fig. 47). A nearly quadrate epiproct (Fig. 46) occurs in *P. australis* and *P. monticola*. The male epiproct and paraproct seem to offer little of taxonomic value.

This study is based on examination of 543 adult specimens. In addition to my own material, specimens from the following collections were examined: American Museum of Natural History (New York City), P. J. Chapman (Geneva, New York), G. E. Eertmoed (Chicago, Illinois), Illinois Natural History Survey (Urbana, Illinois), Snow Entomological Museum (Lawrence, Kansas), United States National Museum (Washington, D. C.), and S. K. Wong (Levin, New Zealand).

Peripsocus alachuae n.sp.

DIAGNOSIS. Female subgenital plate (Fig. 39) with a single median inner sclerite, the sclerite approximately pentagonal in form and lacking a field of granules. Forewing markings (Fig. 3) relatively pale, showing large colorless areas. Male clunial process (Fig. 24) with lateral flanges.

MALE. Measurements, Table I.

MORPHOLOGY. Phallosome (Fig. 22) with base rounded, sides approximately parallel but wider apart in distal than in basal half; distal process short and broad at apex; lateral processes slender, straight but bent at their apices. Radular fork (Fig. 23) with main body a broad triangle; arms long, slender, curved inward. Clunial process (Fig. 24) with broad lateral flanges bearing no denticles.

COLOR (in alcohol). Body same as described for *P. alboguttatus* except dull yellowish-brown areas more extensive; thoracic pleura mostly of this shade. Wings marked as in female (see Fig. 3 and description of female).

TABLE I. Measurements, Ratios, and Ctenidial counts for species of the *Peripsocus alboguttatus* group. IO/D, Least head width between eyes divided by greatest antero-posterior diameter of an eye in dorsal view of head; PO, transverse eye diameter divided by greatest antero-posterior eye diameter in dorsal view of head.

	Forewing length (mm)	Length of hind tibia (mm)	Length of hind tarsal segment 1 (μ)	Length of hind tarsal segment 1 (μ)	Number of ctenidia, hind tarsal segment 1	IO/D	PO
<i>Peripsocus alachuae</i> n.sp., ♂							
Sample size	6	6	6	6	6	5	5
Minimum	1.97	0.63	194	97	14	0.83	0.78
Maximum	2.26	0.73	212	105	16	0.97	0.87
Mean	2.17	0.67	205	102	15	0.91	0.83
S.D.	0.10	0.04	8.5	3.0	0.8	0.07	0.04
<i>Peripsocus alachuae</i> n.sp., ♀							
Sample size	6	6	6	6	6	6	6
Minimum	1.78	0.60	184	100	11	1.92	0.67
Maximum	2.19	0.74	211	115	15	2.36	0.76
Mean	2.00	0.67	195	109	13	2.17	0.72
S.D.	0.16	0.05	10.6	5.4	1.4	0.21	0.03
<i>Peripsocus alboguttatus</i> Dalman, ♀, Eastern U.S.							
Sample size	10	10	10	10	10	10	10
Minimum	2.24	0.77	228	116	13	1.88	0.67
Maximum	2.75	0.89	275	143	16	2.30	0.75
Mean	2.55	0.83	253	131	14	2.16	0.72
S.D.	0.16	0.04	13.3	8.6	0.8	0.12	0.03
<i>Peripsocus alboguttatus</i> Dalman, ♂, Western U.S.							
One specimen	2.30	0.76	235	100	17	1.45	0.76
<i>Peripsocus alboguttatus</i> Dalman, ♀, Western U.S.							
Sample size	10	10	10	10	10	10	10
Minimum	2.12	0.76	233	117	10	2.36	0.67
Maximum	2.63	0.92	273	135	17	2.67	0.77
Mean	2.36	0.83	249	125	13	2.51	0.71
S.D.	0.19	0.01	12.2	6.4	2.7	0.12	0.03
<i>Peripsocus australis</i> n.sp., ♂							
Sample size	6	6	6	6	6	6	6
Minimum	2.37	0.79	253	107	15	0.55	0.79
Maximum	2.60	0.88	287	115	20	0.71	0.89
Mean	2.52	0.85	269	112	17	0.62	0.83
S.D.	0.09	0.03	14.9	2.9	1.7	0.06	0.03
<i>Peripsocus australis</i> n.sp., ♀							
Sample size	10	10	10	10	10	10	10
Minimum	2.35	0.75	216	109	11	1.82	0.63
Maximum	2.55	0.86	249	123	18	2.03	0.75
Mean	2.46	0.81	238	117	15	1.96	0.69
S.D.	0.06	0.04	10.8	3.7	2.1	0.06	0.04

TABLE I. (Continued)

	Forewing length (mm)	Length of hind tibia (mm)	Length of hind tarsal segment 1 (μ)	Length of hind tarsal segment 1 (μ)	Number of ctenidia, hind tarsal segment 1	IO/D	PO
<i>Peripsocus maculosus</i> n.sp., ♀, Northern form							
Sample size	28	28	28	28	28	28	28
Minimum	2.22	0.73	200	106	11	2.13	0.64
Maximum	2.75	0.96	280	144	16	2.51	0.74
Mean	2.52	0.88	253	130	13	2.27	0.70
S.D.	0.15	0.07	18.4	9.6	1.5	0.10	0.03
<i>Peripsocus maculosus</i> n.sp., ♀, intermediate form							
Sample size	4	4	4	4	4	4	4
Minimum	2.08	0.78	238	115	13	2.00	0.72
Maximum	2.40	0.84	251	123	14	2.15	0.75
Mean	2.24	0.81	245	119	14	2.08	0.73
S.D.	0.13	0.03	6.7	4.1	0.5	0.06	0.01
<i>Peripsocus maculosus</i> n.sp., ♀, Southern form							
Sample size	16	16	16	16	16	16	16
Minimum	1.60	0.55	179	97	11	1.94	0.69
Maximum	2.16	0.79	251	127	15	2.23	0.80
Mean	1.84	0.66	212	109	13	2.07	0.75
S.D.	0.17	0.07	19.2	8.1	1.1	0.09	0.03
<i>Peripsocus madescens</i> (Walsh), ♂, U.S.							
Sample size	5	5	5	5	5	5	5
Minimum	1.82	0.68	206	100	14	1.74	0.76
Maximum	2.01	0.72	233	108	17	1.79	0.80
Mean	1.92	0.70	218	103	15	1.77	0.78
S.D.	0.08	0.01	12.4	3.6	1.1	0.03	0.01
<i>Peripsocus madescens</i> (Walsh), ♀, U.S.							
Sample size	10	10	10	10	10	9	9
Minimum	2.17	0.77	208	107	12	2.13	0.68
Maximum	2.77	0.99	266	134	15	2.55	0.76
Mean	2.38	0.84	241	127	14	2.36	0.73
S.D.	0.17	0.06	17.4	7.7	1.1	0.13	0.02
<i>Peripsocus madescens</i> (Walsh), ♂, Mexico							
Sample size	3	3	3	3	3	2	2
Minimum	1.62	0.61	189	104	13	1.78	0.76
Maximum	1.72	0.62	210	110	16	1.89	0.78
Mean	1.66	0.62	201	107	14	1.83	0.77
S.D.	0.05	0.01	11.0	3.1	1.5	0.08	0.01
<i>Peripsocus madescens</i> (Walsh), ♀, Mexico							
One specimen	1.68	0.64	193	112	11	—	—
<i>Peripsocus minimus</i> n.sp., ♂							
Sample size	8	9	9	9	9	9	9
Minimum	1.96	0.62	207	100	14	0.84	0.77
Maximum	2.12	0.71	233	115	18	0.98	0.88
Mean	2.05	0.68	220	106	16	0.92	0.82
S.D.	0.05	0.01	9.2	5.9	1.2	0.04	0.03

TABLE I. (Continued)

	Forewing length (mm)	Length of hind tibia (mm)	Length of hind tarsal segment 1 (μ)	Length of hind tarsal segment 1 (μ)	Number of ctenidia, hind tarsal segment 1	IO/D	PO
<i>Peripsocus minimus</i> n.sp., ♀							
Sample size	11	11	11	11	11	10	10
Minimum	1.68	0.61	189	104	9	2.06	0.65
Maximum	2.08	0.68	217	123	14	2.28	0.74
Mean	1.96	0.64	199	113	12	2.17	0.68
S.D.	0.11	0.03	9.0	5.2	1.3	0.08	0.02
<i>Peripsocus monticola</i> n.sp., ♂							
One specimen	2.56	0.94	275	116	17	0.96	0.78
<i>Peripsocus monticola</i> n.sp., ♀							
Two	2.71	1.08	304	138	18	2.86	0.69
Specimens	2.66	1.05	296	129	16	2.81	0.64
<i>Peripsocus potosi</i> n.sp., ♀, Jamaica, W. I.							
Two	2.25	0.78	227	107	13	2.00	0.65
Specimens	2.15	0.70	200	103	12	2.01	0.69
<i>Peripsocus potosi</i> n.sp., ♀, Mexico							
Sample size	12	12	12	12	12	12	12
Minimum	1.88	0.64	181	100	12	1.86	0.61
Maximum	2.30	0.72	215	115	16	1.96	0.69
Mean	2.09	0.67	206	106	14	1.90	0.66
S.D.	0.10	0.02	9.3	1.2	1.3	0.03	0.03
<i>Peripsocus potosi</i> n.sp., ♀, Puerto Rico							
Sample size	11	11	11	11	11	11	11
Minimum	2.19	0.73	208	110	10	1.84	0.66
Maximum	2.34	0.78	233	128	15	2.07	0.78
Mean	2.28	0.76	223	120	12	1.93	0.72
S.D.	0.04	0.02	8.3	6.0	1.4	0.08	0.03
<i>Peripsocus potosi</i> n.sp., ♀, Trinidad, W. I.							
Two	2.13	0.70	204	109	11	1.86	0.68
Specimens	2.18	0.68	205	113	12	2.01	0.67
<i>Peripsocus teutonicus</i> n.sp., ♀							
Sample size	11	11	11	11	11	11	11
Minimum	2.35	0.79	219	118	10	1.94	0.68
Maximum	2.59	0.87	247	136	14	2.21	0.74
Mean	2.47	0.82	235	129	12	2.08	0.70
S.D.	0.08	0.02	8.4	5.9	1.3	0.09	0.02

FEMALE. Measurements, Table I.

MORPHOLOGY. Subgenital plate (Fig. 39) with apical process decidedly broader at base than long, abruptly tapering to rounded apex; pigmented area of face of plate quadrate with arms directed antero-laterally, straight; a median lobe directed forward between bases of

arms; setae scattered over face of plate and median pigment lobe. Gonapophyses (Fig. 40): first valvula decidedly arched ventrally, its apex abruptly pointed; second valvula somewhat tapering toward apex; third valvula with apex broadly rounded and directed posteriorly.

COLOR (in alcohol). Body coloration as in male. Forewing markings (Fig. 3): Pterostigma pale or with a dark distal spot; first dark transverse row scarcely visible; second dark transverse row lacking spot no. 1 or with it very small; third dark transverse row exceedingly pale or absent; outer dark radial arc absent or represented by spots no. 2 and 3. Hindwings unmarked.

RANGE. State of Florida, not yet recorded from southern third of peninsula.

TYPE LOCALITY. Archbold Biological Station, Highlands County, Florida, February 13, 1967, light trap, S. W. Frost, holotype ♂, allotype ♀, and 2 ♂ paratypes. Types are in the author's collection.

RECORDS. Florida: Gainesville, March 13, 1963, black light trap, 1 ♀, H. A. Denmark; April 17, 1965, beating vegetation in pine-hardwoods forest, 1 ♂, E. L. Mockford and J. Manzano; 5 miles west of Gainesville on Highway 26, October 23, 1953, beating *Crataegus* and sifting *Crataegus* leaf litter, 2 ♂, E. L. Mockford; 14.6 miles north of Milton on Highway 87 (Santa Rosa County), August 21, 1951, 1 ♀, E. L. Mockford; Newnan's Lake, July 25, 1952, sweeping grasses, mostly *Andropogon*, 1 ♀, E. L. Mockford; Oleno State Park (Columbia County), March 26, 1953, beating shrubs in river swamp-xeric hammock transition area, 1 ♂, 2 ♀, E. L. Mockford; 7 miles south of Port Richey on Highway 19 (Pasco County), November 30, 1961, beating mostly laurel oak (*Quercus laurifolia* Michx.), 1 ♀, E. L. Mockford and R. O. Rilett.

Peripsocus alboguttatus (Dalman)

Psocus alboguttatus Dalman, 1823: 98.

Complete synonymy in Smithers (1967: 68).

DIAGNOSIS. Larger species, forewings always greater than 2.1 mm. in length. Female subgenital plate with two distinctly separate inner sclerites. Form in eastern United States presumably parthenogenetic (males unknown), with forewing markings decidedly contrasty (Fig. 7); form in Pacific Northwest bisexual, forewing markings less contrasty than in eastern form (Fig. 8).

MALE. Measurements of North American material, Table I.

MORPHOLOGY. Phallosome (Fig. 19) with sides parallel, its distal process slender, not or scarcely widened at tip; lateral processes slender, each arising from a small, rounded sclerite. Radular fork (Fig. 20) with its main body in form of a broad triangle; arms straight. Clunial process (Fig. 21) with lateral flanges bearing a few minute denticles.

COLOR (in alcohol). Head medium brown except dull yellowish-white on genae and anterior third of vertex; labrum dark brown. Compound eyes and ocelli black. Antennae pale brown. Thoracic notal lobes medium dark brown, areas bordering sutures between lobes dull yellowish-white. Thoracic pleura and legs medium brown, sutures of pleura

darker. Forewings marked as in female (Fig. 8) but less intensely. Hindwings unmarked. Preclunial segments of abdomen yellowish-white ringed with broken bands of purplish-brown subcuticular pigment. Terminal abdominal segments medium brown.

FEMALE. Measurements, Table I.

MORPHOLOGY. Subgenital plate (Fig. 34) with apical process slightly broader at base than long; pigmented arms wide, diverging strongly, slightly curved; setae scattered through broad central region and across posterior third of face of plate. Gonapophyses (Fig. 33): first valvula slightly arched ventrally, with a slender apex (as in Fig. 35 of *P. maculosus*) or not; second valvula with narrowed apex; third valvula rounded apically, the apex directed slightly ventrad.

COLOR (in alcohol). Body coloration same as in male except brown areas duskier.

Forewing marking characteristics for material from eastern United States: pterostigma uniformly dark throughout; first dark transverse row indistinct; in second dark transverse row, spot no. 4 uniformly dark; in second dark transverse row, spot no. 2 curved; in outer pale radial arc, all spots present but no. 3 indistinct; in outer dark radial arc, spot no. 1 small, no. 5 absent.

Forewing marking characteristics for material from Pacific Northwest differing from above as follows: in second dark transverse row, spot no. 5 very small or absent; in third dark transverse row, spot no. 1 very small or absent; in second pale transverse row, spot no. 2 variable; in outer pale radial arc, all spots present and large; in outer dark radial arc, all spots may be indistinct.

RANGE. Throughout most of Europe, including the British Isles; eastern United States, west in the north to western New York, south in the Appalachians to Tennessee; interior and coast of British Columbia, coastal Washington.

RECORDS. Eastern United States: Maine: Houlton (Aroostook County), August 26, 1925, 1 ♀, C. R. Crosby. Maryland: Cunningham Falls State Park (Frederick County), August 28, 1955, beating hemlock (*Tsuga canadensis* Carr.), 2 ♀, E. L. Mockford; Fishing Creek Reservoir (Frederick County), July 17, 1955, beating hemlock foliage, 1 ♀, E. L. Mockford. New Hampshire: Lafayette Camp near Franconia, September 21, 1956, 1 ♀, G. B. Wiggins. New York: Ballston Lake (Saratoga County), July 14, 1926, beating, 1 ♀, P. J. Chapman; Fair Haven (Cayuga County), September 7, 1924, 1 ♀; Hunter, August 16, 1925, beating, 5 ♀; Ithaca, Six Mile Creek, July 11, 1926, in dead leaves on tree, 3 ♀, P. J. Chapman; Little Valley (Cattaraugus County), September 17, 1925, 1 ♀, P. J. Chapman; McLean Reserve (Tompkins County), July 16, 1924, 1 ♀; Michigan Mills (Lewis County), September 1, 1926, beating mostly spruce (*Picea* sp.), 29 ♀, P. J. Chapman; Paul Smith's (Franklin County), August 31, 1927, beating mostly larch (*Larix* sp.) and spruce, 38 ♀, P. J. Chapman. Tennessee: Great Smoky Mountains National Park, July 11, 1949, sweeping spruces, el. 5200 ft., 2 ♀, E. L. Mockford. West Virginia: Spruce Knob (Randolph County), October 8–9, 1955, 2 ♀, E. L. Mockford and M. A. Byrd.

Pacific Northwest: British Columbia: 16 miles north of Alexandria on Highway 97, August 2, 1963, beating conifers, 1 ♀, R. C. Rounds; 8.6 miles west of Endake on Highway 16, July 31, 1963, on spruce, 1 ♂, 4 ♀, R. C. Rounds

and McCort; Vancouver, University of B. C., August 9, 1963, on broom (*Cystisus scoparius* (L.) Link), 4 ♀, R. C. Rounds. Washington: 8.7 miles east of Olympia on Highway 99 (Pierce County), June 28, 1963, beating alders (*Alnus* sp.) and maples (*Acer* sp.), 2 ♂, 1 ♀, 1 nymph, E. L. Mockford and F. Hill.

DISCUSSION. This species, which occurs throughout Europe, may have been introduced on the coast of Washington and adjacent British Columbia. Its introduction into eastern United States is considerably less likely, as it is apparently parthenogenetic there and its range seems to center on the Appalachian Mountains rather than on the coast.

Peripsocus australis n.sp.

DIAGNOSIS. Female subgenital plate (Fig. 48) without an inner sclerite but with a rounded, slightly thickened median region, this region bearing a central dark-staining field of granules. Forewing pattern (Fig. 11) relatively obscure; both inner and outer series of radial pale spots very indistinct beyond first two spots in each. Female gonapophyses (Fig. 49) with second valvula relatively long and slender; third valvula very short, with relatively heavy sclerotization around its margin. Male clunial process (Fig. 14) lacking flanges.

Differing from *P. balli* Badonnel by relatively shorter and broader apical process of subgenital plate, presence of lateral points on pigmented arms of subgenital plate, relatively broader second valvula of female gonapophyses.

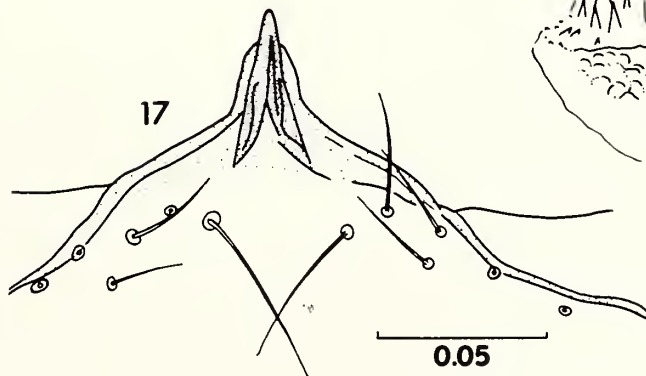
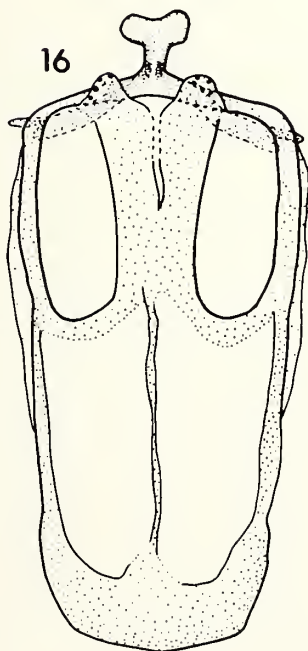
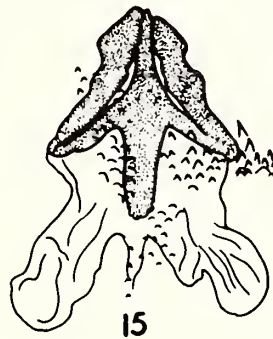
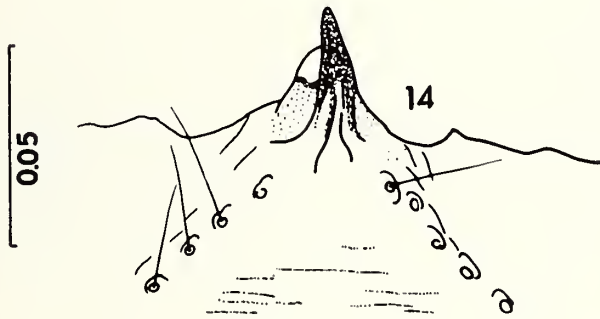
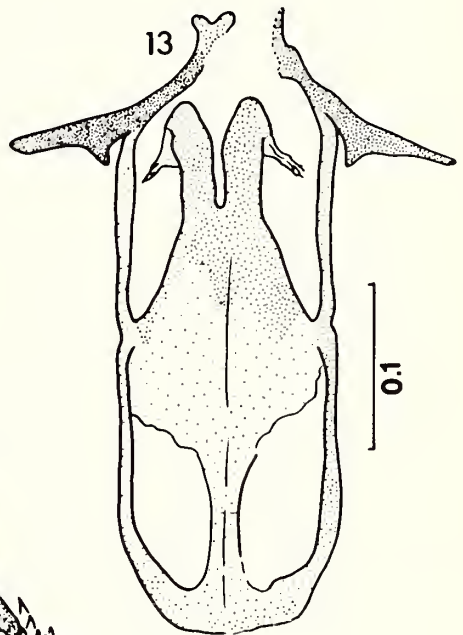
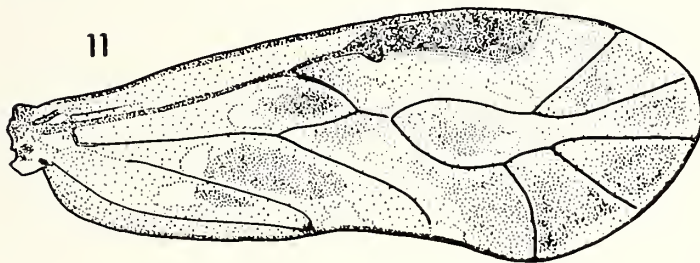
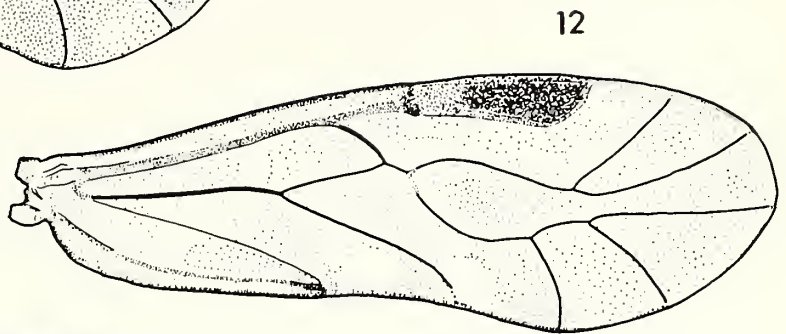
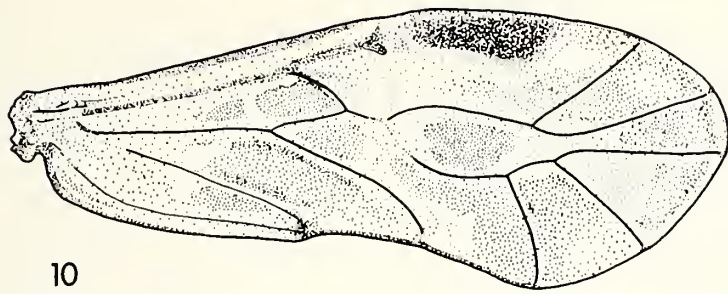
MALE. Measurements, Table I.

MORPHOLOGY. Phallosome (Fig. 13) with base rounded, sides parallel; distal process short, bilobed at tip; lateral processes strong, directed antero-laterally. Radular fork (Fig. 15) with slender, acuminate main body; broad, slightly curved arms. Clunial process (Fig. 14) lacking lateral flanges, subtended by a short, rounded process.

COLOR (in alcohol). Head and its appendages dusky brown except for a wide semicircle of pale brown with posterior arc on vertex around ocellar interval and including frontal part of fronto-clypeus. Ocellar interval dark brown, compound eyes black. Thorax as in *P. alboguttatus* but brown regions duskier. Forewings (Fig. 10) marked as in female except dark spots in general slightly paler. Hindwings unmarked, but with slight grayish-brown wash near apex. Abdomen with membranous portion white showing dorsally slight amounts of scattered purplish-brown subcuticular pigment and a narrow dorso-medial tergal band of cuticular pigment in each of segments 5, 6, and 7; sclerotized portions of terminal segments dusky brown.

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FIGS. 10–18. Forewings and male genitalic parts of *Peripsocus alboguttatus* group species. Fig. 10. *P. australis* n.sp. ♂, forewing. Fig. 11. *P. australis* n.sp. ♀, forewing (scale of Fig. 10). Fig. 12. *P. monticola* n.sp. ♀, forewing (scale of Fig. 10). Fig. 13. *P. australis* n.sp. ♂, phallosome, damaged in mounting. Fig. 14. *P. australis* n.sp. ♂, clunial process. Fig. 15. *P. australis* n.sp. ♂, fork sclerite and associated endophallic structures. Fig. 16. *P. monticola* n.sp. ♂, phallosome (scale of Fig. 13). Fig. 17. *P. monticola* n.sp. ♂, clunial process. Fig. 18. *P. monticola* n.sp. ♂, fork sclerite and associated endophallic structures (scale of Fig. 15).



FEMALE. Measurements, Table I.

MORPHOLOGY. Subgenital plate (Fig. 48) with its apical process very slightly longer than its basal width; short setae scattered length of process; lateral arms of pigmented area diverging strongly then in their anterior third bending anteriorly, the pigment forming a lateral point at this bend; a slight median lobe visible between arms in stained material. Setae on face of subgenital plate concentrated mostly along bases of arms, some scattered on arms and on median lobe. Gonapophyses as described in diagnosis.

COLOR (in alcohol). Body essentially same as in male but pale area of vertex and frons nearly white and more extensive; genae of same color; membranous portions of abdomen somewhat more densely pigmented with purplish-brown subcuticular pigment; tergal bands absent on segments 5-7. Forewing markings (Fig. 11): pterostigma paler in basal third than in remainder with reflected light, nearly uniformly dark with transmitted light (the difference with transmitted light more pronounced in males); first dark transverse row absent, or spot no. 1 present; second dark transverse row with spot no. 1 obscure; third dark transverse row represented by spot no. 1, this spot continuous with dark spot no. 6 of the outer dark radial arc. Hindwings unmarked, washed with gray.

TYPE LOCALITY. Nova Teutonia, Santa Catarina, Brazil (27°11' south, 52°23' west), September and October, 1970, el. 300-500 m, Fritz Plaumann, holotype ♂, allotype ♀, 5 ♂ and 10 ♀ paratypes. Types be deposited in the United States National Museum.

Peripsocus balli Badonnel

Peripsocus balli Badonnel, 1948: 311.

Although I have seen no material of this species, comparison with Badonnel's detailed and superbly illustrated description allows one to conclude that a very close relationship exists between this species of the Congo Republic and the south Brazilian *P. australis* n.sp. In view of this relationship, it seems highly probable that the male tentatively assigned to *P. balli* by Badonnel (1969) represents another species, not a member of the *alboguttatus* group.

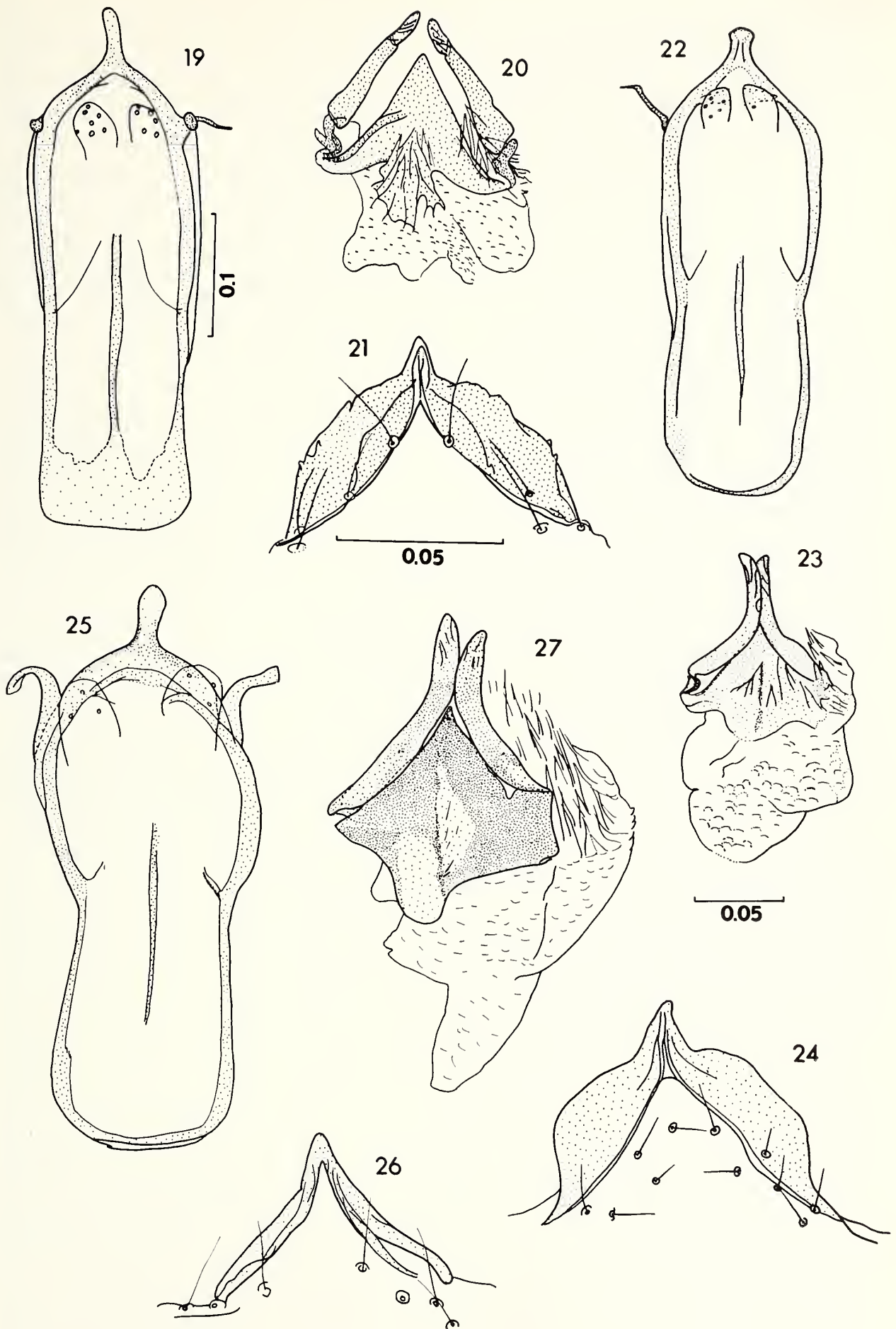
Peripsocus maculosus n.sp. (♀)

DIAGNOSIS. Female subgenital plate with a single median inner sclerite, the sclerite broader than long and showing slight indication of central division. Forewing marking pattern (Fig. 1) decidedly contrasty. Males unknown.

FEMALE. Measurements, Table I.

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Figs. 19-27. Male genitalic parts of *Peripsocus alboguttatus* group species. Fig. 19. *P. alboguttatus* Dalman ♂, phallosome. Specimen from Pacific Northwest. Fig. 20. *P. alboguttatus* Dalman ♂, fork sclerite and associated endophallic structures (scale of Fig. 23). Fig. 21. *P. alboguttatus* Dalman ♂, clunial process. Fig. 22. *P. alachucae* n.sp. ♂, phallosome (scale of Fig. 19). Fig. 23. *P. alachucae* n.sp. ♂, fork sclerite and associated endophallic structures. Fig. 24. *P. alachucae* n.sp. ♂, clunial process (scale of Fig. 21). Fig. 25. *P. madescens* Walsh ♂, phallosome (scale of Fig. 19). Fig. 26. *P. madescens* Walsh ♂, clunial process (scale of Fig. 21). Fig. 27. *P. madescens* Walsh ♂, fork sclerite and associated endophallic structures (scale of Fig. 23).



MORPHOLOGY. Subgenital plate (Fig. 36) with apical process slightly broader at base than long; pigmented arms wide basally, decidedly tapering and curved outward toward their apices, a small pigmented lobe between the arms; setae mostly concentrated in a row across posterior third of face of plate, a few setae scattered over face of plate. Gonapophyses (Fig. 35): first valvula arched ventrally, with narrowed apex; second valvula slightly narrowed apically; third valvula rounded apically, its apex directed somewhat ventrad.

COLOR (in alcohol). Body coloration as described for *P. alboguttatus* male except dull yellowish-white area of vertex more extensive, entire ocellar interval dark brown. Forewing markings (Fig. 1): pterostigma paler basally than distally; first dark transverse row distinct; spot no. 2 of second pale transverse row a straight, narrow, transversely-oriented band; in outer dark radial arc, spots no. 1 and 5 poorly developed or absent. Hindwing with a brown wash at wing apex and at apex of cell Cu_2 , otherwise unmarked.

RANGE. Eastern United States and southeastern Canada.

TYPE LOCALITY. Lagrange County, Indiana, U. S. Highway 20, 8 miles west of Lagrange, July 6, 1956, beating larches (*Laryx laricina* Koch), E. L. Mockford, holotype ♀, 12 ♀ paratypes, and 4 nymphs. Types are in the author's collection.

RECORDS. Canada: Quebec: near Mascouche on Highway 18 (L'Assomption County), August 21, 1956, beating spruce, 5 ♀, beating branches of broad-leaved trees, 1 ♀, E. L. Mockford; near Sainte Julienne on Highway 18 (L'Assomption County), August 21, 1956, beating conifers, 3 ♀, E. L. Mockford. United States: Arkansas: Drew County, June 15, 1967, 1 ♀, I. Brown. Florida: The Glen (Marion County), March 6, 1927, 8 ♀, M. D. Leonard. Illinois: Mundelein (Lake County), July 26, 1959, beating conifers, 2 ♀, E. L. Mockford and J. Mathieu; Pine Hills Recreation Area (Union County), September 20, 1959, beating oaks (*Quercus* spp.), 1 ♀, E. L. Mockford; Pounds Hollow Recreation Area (Gallatin County), June 29, 1958, beating *Pinus echinata* Mill., 1 ♀, July 18, 1959, beating *P. echinata*, mostly dead branches, 12 ♀, 2 nymphs, E. L. Mockford. Indiana: Bloomington, October 29, 1949, *ex* pines (*Pinus* sp.), 3 ♀, E. L. Mockford; Clifty Falls State Park (Jefferson County), June 5, 1959, beating *Juniperus virginiana* L. on bluff, 1 ♀, E. L. Mockford. Michigan: Edwin S. George Reserve (Livingston County), July 8, 1956, beating *Vaccinium* and white oak (*Quercus alba* L.), 1 ♀, August 2, 1956, beating sumacs (*Rhus* sp.), 2 ♀, 4 nymphs, E. L. Mockford; Mud Lake Bog (Washtenaw County), July 20, 1956, beating black spruce, (*Picea mariana* B.S.P.), foliage and dead branches, 4 ♀, E. L. Mockford. Minnesota: Kabetogama Lake (St. Louis County), September 3–10, 1966, *ex Picea* sp., 3 ♀, J. Pinto. Mississippi: Chawalla Recreation Area near Potts Camp (Marshall County), June 16, 1970, beating junipers and pines, 2 ♀, E. L. Mockford and A. Manzano. Missouri: Fredricktown, June 12, 1969, beating *Juniperus virginiana*, 1 ♀, E. L. Mockford and J. Schaab; 7 miles south of Fredricktown on Highway 67, June 12, 1969, beating *Pinus echinata*, 1 ♀, 1 nymph, E. L. Mockford; 27 miles north of Poplar Bluff on Highway 67 (Wayne County), June 12, 1969, beating *Juniperus virginiana* on hillside, 3 ♀, E. L. Mockford. New York: Fredonia, July 21,

1946, 1 ♀, R. H. Beamer; Ithaca, August 6, 1926, beating, 1 ♀, P. J. Chapman; Ithaca, Six Mile Creek, September 6–26, 1926, 6 ♀, P. J. Chapman; Nigger Pond (Oswego County), September 3, 1926, 4 ♀, P. J. Chapman; Woodwardia Swamp (Tompkins County), August 10, 1924, 5 ♀. Virginia: Cumberland State Forest (Cumberland County), September 20, 1955, on dead *Pinus virginiana*, 44 ♀, 22 nymphs, M. A. Byrd. Wisconsin: 11 miles east and 4 miles south of Siren (Burnett County), August 6, 1966, 1 ♀, Dean Hansen.

DISCUSSION. Decided differences in size exist between material from near the northern edge of the known range and material from certain southern localities. The relationship does not seem to be one of a strict north-south size cline. The largest specimens are known from southern Michigan, northern Indiana, and western New York. Material from southern Quebec averages somewhat smaller. The smallest specimens are from extreme southern Illinois (Pound's Hollow Recreation Area, Gallatin County), and central Virginia (Cumberland County). Specimens from northern Mississippi and northern Florida average somewhat larger. Specimens from localities lying roughly between those of the largest and those of the smallest specimens are intermediate in size.

Peripsocus madescens Walsh

Psocus madescens Walsh, 1863: 186.

Complete synonymy in Smithers (1967: 69).

DIAGNOSIS. Female subgenital plate with a single median inner sclerite, the sclerite approximately quadrate in form and bearing near its posterior margin a field of dark-staining granules. Forewing markings (Fig. 9) contrasty. Male clunial process (Fig. 26) lacking lateral flanges.

MALE. Measurements, Table I.

MORPHOLOGY. Phallosome (Fig. 25) with sides approximately parallel in basal half, arched outward in distal half; distal process decidedly widened preapically; lateral processes decidedly curved. Radular fork (Fig. 27) with main body in form of broad triangle, its arms long and curved. Clunial process (Fig. 26) lacking lateral flanges.

COLOR (in alcohol). As described for *P. alboguttatus*, except entire ocellar interval dark brown, fronto-clypeus distinctly striated with medium-brown lines. Wings marked as in female (see Fig. 9 and female description).

FEMALE. Measurements, Table I.

MORPHOLOGY. Subgenital plate (Fig. 37) with apical process slightly broader at base than long; pigmented area of plate quadrate with slender arms curving antero-laterally and a median lobe between the arms; setae scattered over face of plate and median pigment lobe. Gonapophyses (Fig. 38): first valvula arched ventrally, with short narrowed apex; second valvula broad apically; third valvula with apex obtusely tapered, directed posteriorly.

COLOR (in alcohol). Body coloration same as in male. Forewing markings (Fig. 9): pterostigma paler basally than distally; in third dark transverse row, spot no. 1 small or absent; in second pale transverse row, spot no. 2 somewhat curved; in inner pale radial arc, spot no. 6 obscure or absent; in outer dark radial arc, spots no. 1, 4, and 5 obscure or

absent. Hindwing with a slight brown wash at wing apex and apex of cell Cu_2 , otherwise unmarked.

RANGE. Eastern United States in general, eastern Puebla and northern coast of Veracruz in Mexico.

TYPE LOCALITY. Near Rock Island, Illinois.

RECORDS. Mexico: Puebla: 4 miles northeast of Teziutlan, August 17, 1958, beating in cloud forest, 1 ♀, E. L. Mockford. Veracruz: 5 miles south of Tecolutla on coast, June 26, 1962, beating low strand vegetation, 5 ♂, 2 ♀, E. L. Mockford.

United States: Alabama: Mt. Cheaha, near Pulpit Rock (Cleburne County), August 19, 1951, *ex Pinus echinata*, 1 ♂, E. L. Mockford. Arkansas: Mt. Magazine (Logan County), July 15, 1949, 1 ♂, M. W. Sanderson and L. J. Stannard. Florida: Archbold Biological Station (Highlands County), February 13, 1967, light trap, 1 ♂, S. W. Frost; near Homestead, Everglades National Park Entrance, December 3, 1970, beating small palms and other vegetation, 2 ♂, 1 ♀, E. L. Mockford and A. Manzano; Otter Creek at Highway 24 (Levy County), November 8, 1953, beating trees and shrubs, 1 ♀, E. L. Mockford. Georgia: Hard Labor Creek State Park (Morgan County), September 1, 1951, swept from pine foliage, 1 ♀, E. L. Mockford; Macon, April 12, 1965, beating dried leaves on branches, 2 ♀, E. L. Mockford; Pearson (Atkinson County), September 1, 1951, sweeping shrubs, 1 ♀, E. L. Mockford; Tiger, October 18, 1926, 1 ♀, C. R. Crosby and S. C. Bishop. Illinois: Belleville, August 12, 1926, 1 ♀, C. R. Crosby; Mason State Forest (Mason County), July 2, 1961, beating dead pine branches on ground, 1 ♀, E. L. Mockford; 5 miles west of Pounds Hollow (Gallatin County), May 24, 1966, 2 ♀, J. K. Bouseman. Indiana: Bloomington, September 23–24, 1949, sweeping pines, 2 ♀, E. L. Mockford; Indianapolis, August 8, 1950, sweeping Scotch pine (*Pinus sylvestris* L.), 2 ♀, D. W. Rice; Oklandon, September 12, 1948, sweeping pines, 3 ♀, E. L. Mockford and D. W. Rice. Kentucky: McCracken County, September 17, 1938, from weeds in peach orchard, 1 ♂, W. F. Turner. Maine: Southwest Harbor, Mount Desert Island, August 8, 1937, 4 ♂. Michigan: Cheboygan County, August 22, 1955, 1 ♀; Edwin S. George Reserve (Livingston County), August 6, 1956, beating dead branches of broad-leaved trees, 2 ♀, E. L. Mockford; Midland County, June 24, 1952, 1 ♀, R. R. Dreisbach. Mississippi: 5 miles north of Ashland (Benton County), June 15, 1970, beating in mesophytic forest, 1 ♀, E. L. Mockford and A. Manzano; Chawalla Recreation Area near Potts Camp (Marshall County), June 16, 1970, beating junipers and pines, 1 ♀, E. L. Mockford. New Hampshire: Canaan, July 26, 1948, beating pines, 1 ♀, A. H. Sommerman. New York: Wellsville, September 15, 1925, 1 ♀, P. J. Chapman. North Carolina: Nelson, August 31, 1946, 1 ♀, L. D. Beamer. Virginia: Cum-

berland State Forest (Cumberland County), August 27, 1955, on dead Virginia pine, 1 ♀, 2 nymphs, M. A. Byrd.

DISCUSSION. The records under this name published by Chapman (1930) included primarily *P. alboguttatus* and *P. maculosus*, hence that author's suggestion of the possible synonymy of *P. madescens* and *P. alboguttatus*. Material tentatively assigned to this species in my list of Indiana psocids (Mockford, 1950: 198) is this species, except for the record from Bloomington, October 29, 1949, which is *P. maculosus*.

Chapman (1930) states that the types of this species are nonexistent. I have searched the following collections for them to no avail: Illinois Natural History Survey, Philadelphia Academy of Natural Sciences, Museum of Comparative Zoology, United States National Museum. I have found no information suggesting that they exist. Walsh's description places the species clearly in the *alboguttatus* group but contains nothing which will distinguish it from *P. alboguttatus* and *P. maculosus*. The type locality is designated as near Rock Island, Illinois.

I am designating as neotype a female specimen from Mason State Forest, Mason County, Illinois, located about 75 miles southeast of Rock Island. The neotype will be deposited in the United States National Museum.

Peripsocus minimus n.sp.

DIAGNOSIS. Small species, forewings less than 2.2 mm. in length. Female subgenital plate with two distinctly separate inner sclerites. Forewing marking pattern obscure (Fig. 4).

MALE. Measurements, Table I.

MORPHOLOGY. Phallosome (Fig. 28) with sides approximately parallel but somewhat tapering from base to tip; distal process slender, not widened at tip; lateral processes slender, recurved. Radular fork (Fig. 32) with main body in form of broadly quadrate base tapering rapidly to acuminate tip; arms straight, relatively short, only just meeting at tips. Clunial process (Fig. 30) with broad lateral flanges bearing no denticles.

COLOR (in alcohol). Head and thorax in general and their appendages slightly contrasting shades of pale brown and dull yellowish-white. Ocellar interval dark brown. Compound eyes bluish-gray in life, becoming black after several months in alcohol. Forewings marked as in female (Fig. 4 and description of female). Abdomen dull white except pale brown on terminal segments.

FEMALE. Measurements, Table I.

MORPHOLOGY. Subgenital plate (Fig. 31) with apical process decidedly broader at base than long, abruptly tapering to rounded apex; pigmented arms wide, diverging strongly, slightly curved; a pigmented tongue extending forward between arms; setae scattered over most of face of plate, somewhat concentrated in postero-median region. Gonapophyses (Fig. 29): first valvula very slightly arched ventrally, narrowing in apical fifth; second valvula with somewhat narrowed apex; third valvula relatively more densely pigmented around its margin than in its middle, with flat dorsal margin and rounded apex directed posteriorly.

COLOR (in alcohol). Body coloration as in male except segments of membranous portion of abdomen each with a transverse violet band of subcuticular pigment on each side, the bands on each of segments 5-7 extending over the entire tergum in a narrow, interrupted line. Subgenital plate and gonapophyses medium brown. Forewing markings (Fig. 4): pterostigma reflecting a paler shade than surrounding membrane but transmitting slightly darker; dark rows and arcs contrasting only slightly with their backgrounds; pale spots mostly obvious; spot no. 1 of first pale transverse row absent or only slightly developed; spot no. 3 of second pale transverse row obscure; entire outer pale radial arc obscure, the posterior three spots sometimes absent. Hindwing with a slight brown wash at its apex, otherwise unmarked.

RANGE. A band from southern Illinois southwestward to eastcentral Texas.

TYPE LOCALITY. Fredricktown, Missouri, June 12, 1969, beating foliage and branches of *Juniperus virginiana* in cemetery, E. L. Mockford and J. Schaab, holotype ♂, allotype ♀, 4 ♂, and 9 ♀ paratypes. Types are in the author's collection.

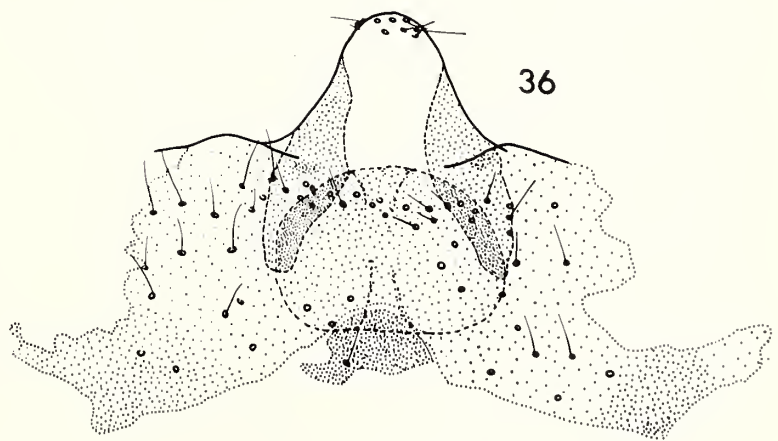
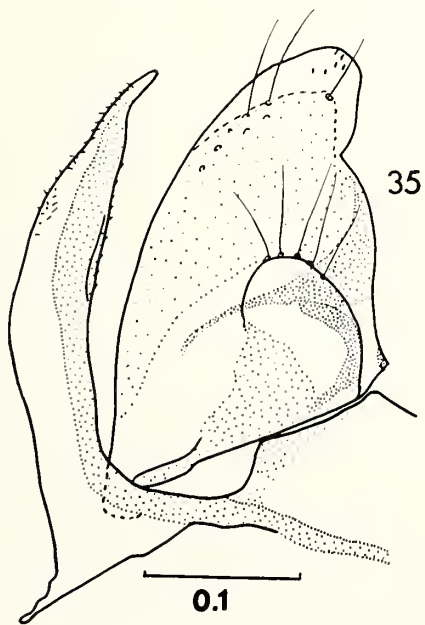
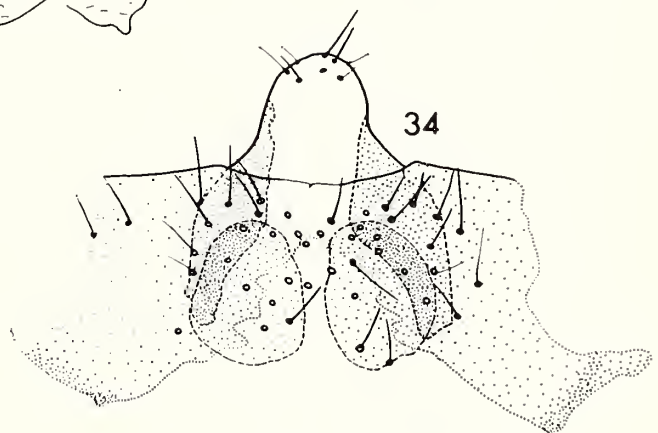
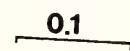
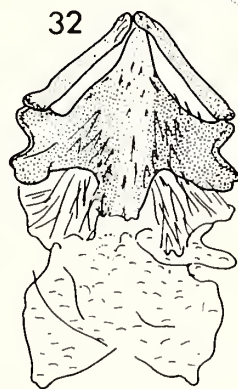
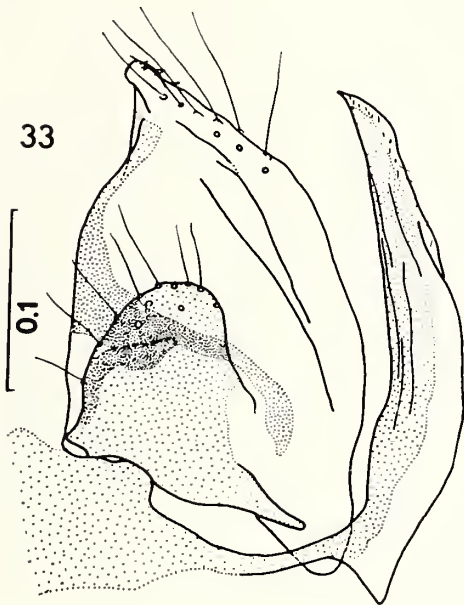
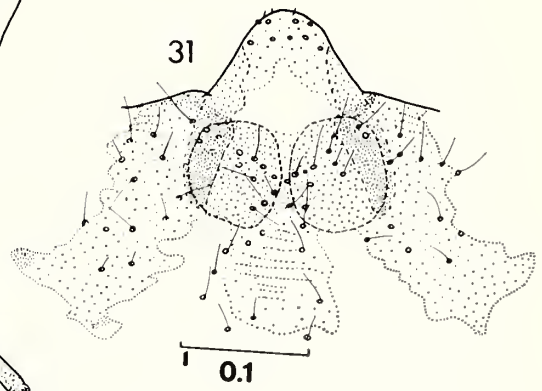
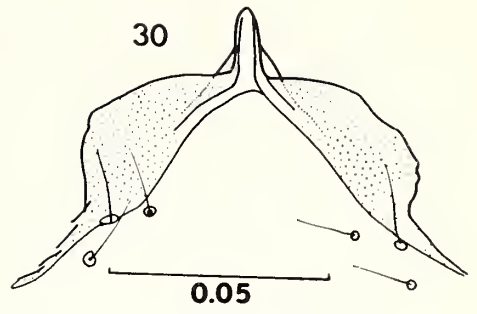
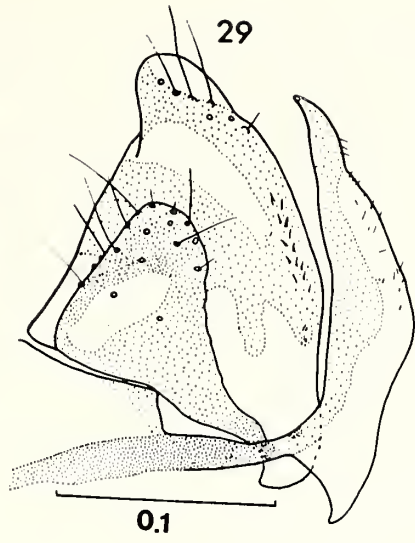
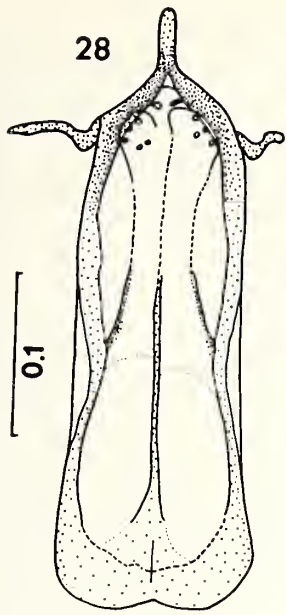
RECORDS. Arkansas: Blakely Mountain Area near Royal (Garland County), June 18, 1970, beating junipers, 7 ♂, 33 ♀, 13 nymphs, E. L. Mockford and T. Fassbender; Spring Lake near Belleville (Yell County), June 19, 1970, beating junipers, 1 ♂, 6 ♀, E. L. Mockford; 5 miles south of Washita on Highway 27 (Montgomery County), June 18, 1970, beating junipers, 1 ♂, 2 ♀, E. L. Mockford and T. Fassbender. Illinois: McLeansboro, May 24, 1959, on junipers, 3 ♂, E. L. Mockford. Missouri: 5 miles south of Festus on Highway 67, June 12, 1969, beating junipers, 4 ♂, 18 ♀, 5 nymphs, E. L. Mockford and J. Schaab; Norfork Lake at Tecumseh (Ozark County), June 13, 1969, 6 ♀, E. L. Mockford and J. Schaab; 27 miles north of Popular Bluff on Highway 67 (Wayne County), June 12, 1969, beating junipers, 1 ♂, 3 ♀, E. L. Mockford; Sam Baker State Park (Wayne County), June 20, 1959, beating junipers, 4 ♂, 5 ♀, E. L. Mockford. Texas: 2.5 miles north of Giddings on Highway 77 (Lee County), June 10, 1962, beating junipers, 1 ♂, 4 ♀, E. L. Mockford, F. Hill, and J. M. Campbell.

Peripsocus monticola n.sp.

DIAGNOSIS. Differing from all other species of the group in lacking completely the radial arcs of spots of the forewing. Female gonapophyses (Fig. 50) developed as in *P. australis*. Male clunial process (Fig. 17) lacking flanges.

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FIGS. 28-36. Male and female genitalic parts of *Peripsocus alboguttatus* group species. Fig. 28. *P. minimus* n.sp. ♂, phallosome. Fig. 29. *P. minimus* n.sp. ♀, gonapophyses. Fig. 30. *P. minimus* n.sp. ♂, clunial process. Fig. 31. *P. minimus* n.sp. ♀, subgenital plate. Fig. 32. *P. minimus* n.sp. ♂, fork sclerite and associated endophallic structures. Fig. 33. *P. alboguttatus* Dalman ♀, gonapophyses. Fig. 34. *P. alboguttatus* Dalman ♀, subgenital plate. Fig. 35. *P. maculosus* n.sp. ♀, gonapophyses. Fig. 36. *P. maculosus* n.sp. ♀, subgenital plate (scale of Fig. 34).



MALE. Measurements, Table I.

MORPHOLOGY. Phallosome (Fig. 16) with base rounded, sides straight, slightly diverging from base to posterior end; distal process with wide, bilobed tip; lateral processes straight, furcated at tips, extending only very slightly beyond edges of phallosome proper. Radular sclerotizations (Fig. 18): fork sclerite with main body slender, acuminately pointed; arms straight, broad near their apices, becoming acuminately pointed at apices; more ventral sclerotizations in form of numerous long, slender denticles. Clunial process (Fig. 17) lacking lateral flanges, subtended by a shorter, rounded process.

COLOR (in alcohol). Body and appendages in general poorly contrasting shades of reddish-brown and dull yellowish-white with a reddish hue. Former color on head appendages, labrum, clypeal striations (these purple at their centers), posterior two-thirds of vertex, thoracic notal lobes (slightly darker here), tibiae, tarsi, and terminal abdominal appendages; latter color on genae, anterior third of vertex and adjacent frontal region, between thoracic notal lobes, on poorly sclerotized parts of thoracic pleura, and on legs from bases to distal ends of femora. Membranous portion of abdomen dull white with scattered patches of purplish-brown subcuticular pigment. A thin dusky-brown sclerotized strip across tergum 6, and another across tergum 7. Compound eyes black, ocellar interval dark brown. Wing markings as described for female.

FEMALE. Measurements, Table I.

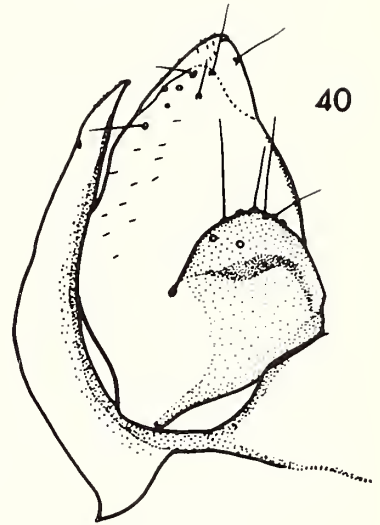
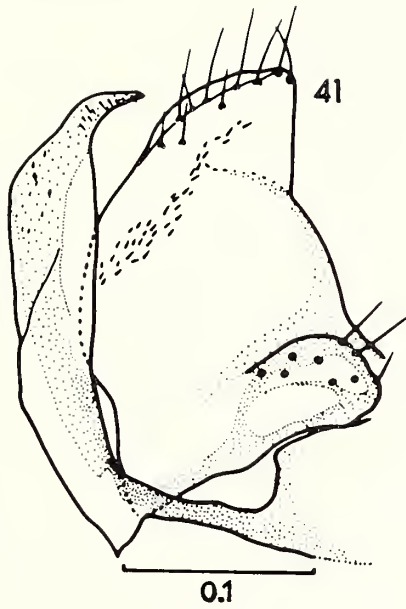
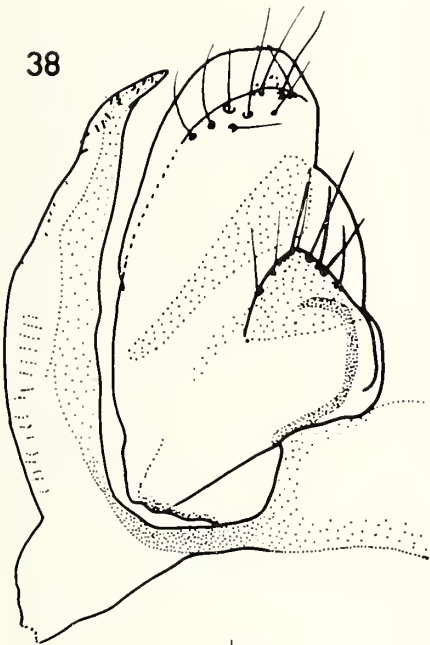
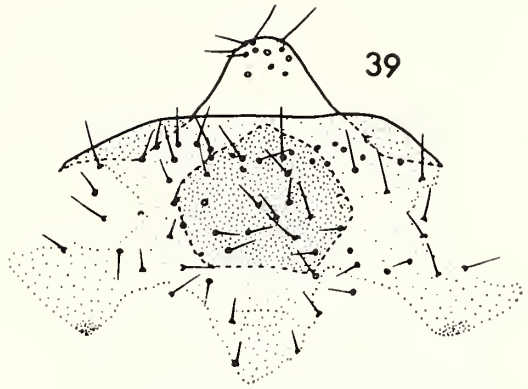
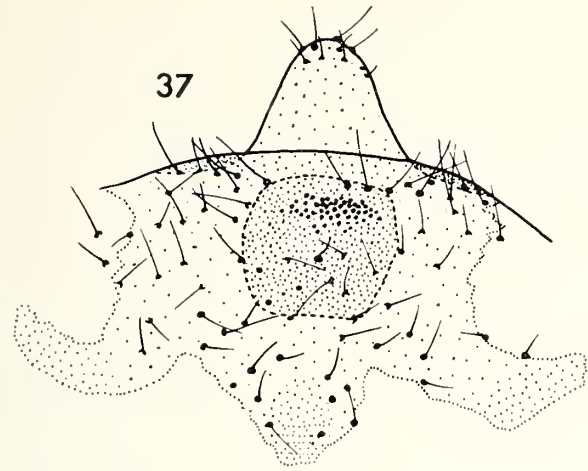
MORPHOLOGY. Subgenital plate (Fig. 51) with its apical process much longer than its basal width; short setae scattered length of process; lateral arms of pigmented area diverging strongly, then in their anterior third bending anteriorly, the pigment forming a lateral point at this bend, a median pigment lobe present between arms in stained specimen; a small central field of dark-staining granules on plate. Setae on face of subgenital plate largely concentrated along a transverse line including bases of pigmented arms and on median pigmented lobe; a few setae scattered on arms. Gonapophyses (Fig. 50): first and second valvulae exceedingly long; first valvula straight, with acuminate tip beset with several short spines; second valvula slender most of its length, but with broad basal attachment to third valvula; third valvula exceedingly short, with a heavily sclerotized submarginal strip, bearing two long and several shorter setae.

COLOR (in alcohol). Similar in general to male, differing as follows: Vertex generally yellowish-white, with purple U-shaped mark, arms of U converging anteriorly on posterior margin of ocellar interval (such a mark exceedingly faint and much shorter on male); this mark setting off a pale orange band bordering epicranial suture to posterior head margin; purple pigment scattered in orange band and to sides of ocellar interval; fronto-clypeus with thin purple striations. Membranous portion of abdomen more generally marked with purplish-brown subcuticular pigment; no sclerotized strips on terga 6 and 7.

FOREWING MARKINGS (Fig. 12). Pterostigma paler in basal third than in remainder, the contrast greater with reflected than with transmitted light; first dark transverse row absent;

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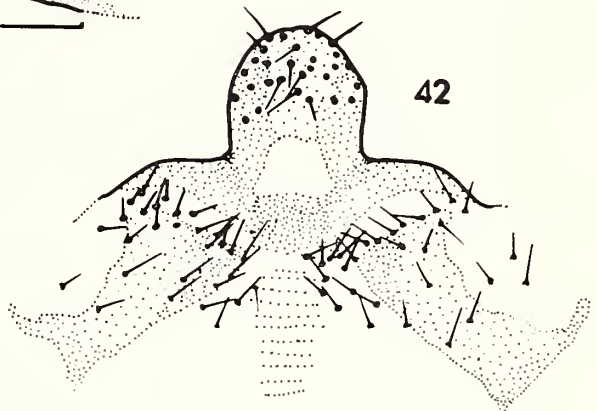
FIGS. 37-44. Female genitalic parts of *Peripsocus alboguttatus* group species. Fig. 37. *P. madescens* Walsh ♀, subgenital plate (scale of Fig. 42). Fig. 38. *P. madescens* Walsh ♀, gonapophyses. Fig. 39. *P. alachuae* n.sp. ♀, subgenital plate (scale of Fig. 42). Fig. 40. *P. alachuae* n.sp. ♀, gonapophyses (scale of Fig. 41). Fig. 41. *P. potosi* n.sp. ♀, gonapophyses. Fig. 42. *P. potosi* n.sp. ♀, subgenital plate. Fig. 43. *P. teutonicus* n.sp. ♀, gonapophyses. Fig. 44. *P. teutonicus* n.sp. ♀, subgenital plate (scale of Fig. 42).



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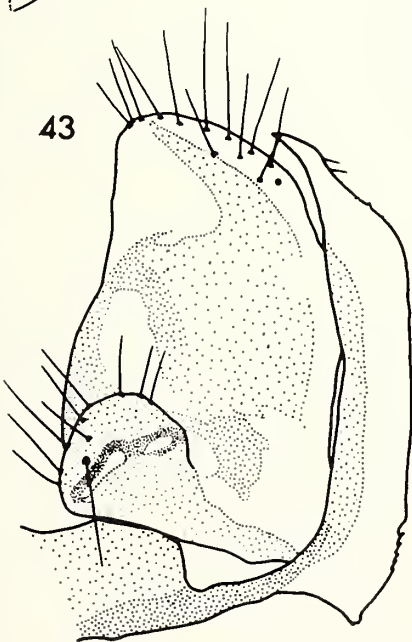
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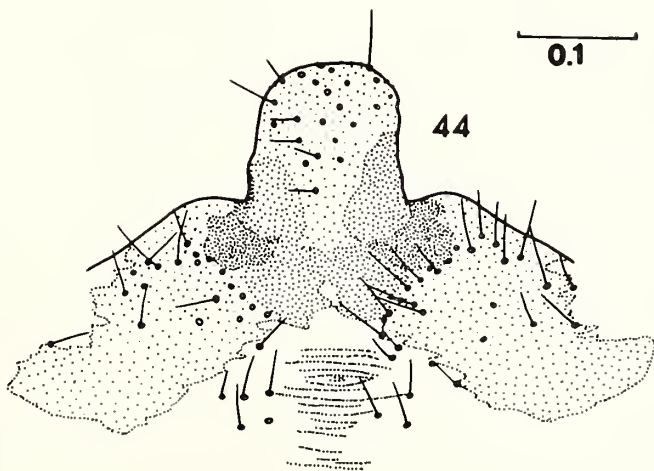


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all other transverse rows present and continuous, i.e., not divided into discrete spots; region of radial arcs entirely of a uniform reddish-brown hue except cell R_1 pale distally. Hindwing with faint reddish-brown wash; in male, wash more prominent at wing apex and at apex of cell Cu_2 ; otherwise unmarked.

TYPE LOCALITY. Hardwar Gap, Jamaica, W. I., November 17, 1959, holotype ♂, allotype ♀, and 1 ♀ paratype, A. M. Nadler. Types will be deposited in the American Museum of Natural History.

Peripsocus potosi n.sp. (♀)

DIAGNOSIS. Female subgenital plate (Fig. 42) without an inner sclerite, but with median region slightly thickened. Forewing pattern (Fig. 5) with inner pale radial series of spots distinct and outer pale radial series represented by at least first three spots. Gonapophyses (Fig. 41) with second valvula relatively short and broad, of normal proportions for the genus; third valvula very short, with relatively heavy sclerotization around its margin. Male unknown.

FEMALE. Measurements, Table I.

MORPHOLOGY. Subgenital plate (Fig. 42) with apical process of same length as width at base, rounded, with short setae scattered over most of its surface. Lateral arms of pigmented area decidedly diverging, straight, a break in pigment at base of each arm; a slight median pigment lobe visible in stained material; setae concentrated mostly along bases of arms, a few scattered along arms. Gonapophyses (Fig. 41): first valvula very slightly arched ventrally, its apex decidedly curved upward and narrowed; second valvula somewhat narrowed in apical third; third valvula short, heavily pigmented (and sclerotized) around its margin, less so centrally.

COLOR (in alcohol). Head and its appendages uniformly pale brown except clypeus darker brown, ocellar interval and compound eyes black. Thoracic notal lobes medium brown, the sutures between lobes somewhat paler. Thoracic pleura pale purplish-brown; legs dull yellowish-white, slightly darker on tibiae. Abdomen with each preclunial segment ringed with a broad purplish-brown band, the bands obscure ventrally. Sclerotized portions of terminal segments medium brown. Forewing markings (Fig. 5): pterostigma pale in basal third, dark in distal two-thirds; first dark transverse row absent or only slightly developed; second dark transverse row spot no. 1 obscure; third dark transverse row absent; first pale transverse row almost continuous but with spot no. 1 obscure; second pale transverse row almost continuous; both dark radial arcs obscure, only spots no. 2 and 3 of both obvious. Hindwings unmarked.

RANGE. Central Mexico south to northern South America, island of Jamaica.

TYPE LOCALITY. Ejido Libertad, 1 mile southwest of Frontera, Tabasco, Mexico, March 17–18, 1964, *ex coconut palms* (*Cocos nucifera* L.), tamarind (*Tamarindus indica* L.), and native vegetation, E. L. Mockford and A. Manzano, holotype ♀, 14 ♀ paratypes, and 8 nymphs; same locality, March 31–April 1, 1964, beating broad-leaved trees and shrubs in rain forest, and planted trees, including coconut palms, 13 ♀ paratypes and 9 nymphs. Types are in the author's collection.

RECORDS. Colombia: Valle: Cali, September 3–4, 1970, light trap, el. 1000 m, 1 ♀, P. Barreto.

Costa Rica: Cartago, July 25, 1963, 3 ♀, D. E. Birkenholz.

Guatemala: 8–10 miles northeast of Guatemala City on Highway 4, August 27, 1968, beating oaks, long-needled pines, and miscellaneous shrubs and trees, 16 ♀, 7 nymphs, E. L. Mockford and A. Garcia Aldrete; 11 miles north of Salamá on Highway 5, August 29, 1968, beating broad-leaved shrubs and trees, 1 ♀, E. L. Mockford and A. Garcia Aldrete.

Mexico: Campeche: 13 miles east of Xpujil, March 28, 1964, beating dried palm leaves, 1 ♀, 1 nymph, E. L. Mockford and A. Manzano. Hidalgo: 5 miles south of Chapulhuacan on Highway 85, June 18, 1966, beating miscellaneous vegetation, 4 ♀, 5 nymphs, E. L. Mockford; 24 miles southeast of Rancho Viejo on Highway 85, June 22, 1962, beating vegetation in forest, 5 ♀, E. L. Mockford, F. Hill, and J. M. Campbell. Puebla: Finca Lourdes, La Union near Juarez, November 2, 1963, beating vegetation in forest 1 ♀, E. L. Mockford. San Luis Potosi: June 21, 1962, beating orange trees (*Citrus sinensis* Osbeck), 1 ♀, E. L. Mockford and F. Hill; El Salto, June 18, 1962, beating lemon tree (*Citrus limonum* (L.) Risso), 1 ♀, E. L. Mockford and F. Hill; Tamazunchale, June 18, 1966, beating *Sabal* palm, 1 ♀, 2 nymphs, E. L. Mockford and A. Manzano. Tabasco: 6 miles west of Macuspana, April 5, 1964, beating small trees in field, 1 ♀, E. L. Mockford; Rio Tonalá on Highway 180, March 17, 1964, beating oil palms, 1 ♀, 10 nymphs, E. L. Mockford. Veracruz: 22.7 miles north of Alvarado on Highway 180, July 8, 1962, beating Australian pine (*Casuarina* sp.), 1 ♀, E. L. Mockford and F. Hill; 9.5 miles east of Orizaba on Highway 150, July 7, 1962, beating dried leaves on branches, 2 ♀, E. L. Mockford and J. M. Campbell; 5.8 miles east of Las Trancas on Highway 140, June 29, 1962, beating shrubs and trees, 1 ♀, E. L. Mockford and F. Hill.

Jamaica, W. I.: Kellits, Mason River Savanna (Clarendon Parish), April 16–17, 1959, 2 ♀, M. W. Sanderson.

Puerto Rico, W. I.: Rio Piedras, March 13–14, 1959, beating West Indian cherry (*Laurocerasus myrtifolia* (L.) Britt.), 12 ♀, E. L. Mockford.

Trinidad, W. I.: Piarco, March 1, 1959, beating low vegetation in forest, 2 ♀, E. L. Mockford.

Peripsocus teutonicus n.sp. (♀)

DIAGNOSIS. Female subgenital plate (Fig. 44) without an inner sclerite, but with median region slightly thickened. Forewing pattern (Fig. 6) with both inner and outer pale radial arcs of spots distinct and complete. Female gonapophyses (Fig. 43) with second valvula relatively short and broad, of normal proportions for the genus; third valvula somewhat shortened, bearing an inner pair of sclerotized loops. Male unknown.

FEMALE. Measurements, Table I.

MORPHOLOGY. Subgenital plate (Fig. 44) with apical process very slightly broader at base than long, its sides approximately parallel nearly to rounded apex, short setae scattered over

most of its surface; lateral arms of pigmented area broad, strongly diverging, rounded apically; a slight pigmented lobe visible between arms in stained material; setae concentrated mostly along bases of pigment arms, a few scattered on rest of face of plate. Gonapophyses (Fig. 43): first valvula very slightly arched ventrally, its apex curved upward and narrowed. Second valvula broad apically; third valvula somewhat shortened, broadly rounded apically, bearing centrally two small regions of weak sclerotization and pigmentation surrounded, or nearly so, by a strongly sclerotized and pigmented rim.

COLOR (in alcohol). Head medium brown along epicranial suture and over entire frontoclypeus and antennae; remainder of head dull white except labrum and ocellar interval dark brown, compound eyes black. Thoracic notal lobes medium brown, the regions between lobes pale brown. Thoracic pleura and legs dusky medium brown. Preclunial abdominal segments ringed with purplish-brown bands, the rings interrupted ventrally. Terminal abdominal segments dusky medium brown. Forewing markings (Fig. 6): pterostigma paler in basal quarter than in remainder; dark transverse rows and radial arcs in general not distinguishable from background, but in some well-colored individuals spots of second dark transverse row and spots no. 2, 3, and 4 of inner dark radial arc visible; pale transverse rows forming almost continuous bands. Hindwings with grayish-brown wash bordering veins, around wing apex, and at apex of cell Cu_2 , otherwise unmarked.

TYPE LOCALITY. Nova Teutonia, Santa Catarina, Brazil ($27^{\circ}11'$ south, $52^{\circ}11'$ west), October–November, 1969, September–October, 1970, el. 300–500 m, Fritz Plaumann, holotype ♀ and 28 ♀ paratypes. Types will be deposited in the United States National Museum.

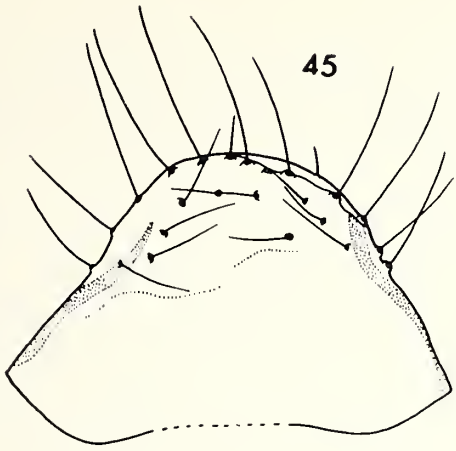
Phylogenetic Relationships in the *Alboguttatus* Group

Absence of a scheme of classification for the genus as a whole, and lack of detailed morphological information for many species make phylogenetic speculation on the *alboguttatus* group exceedingly difficult at this time. Certain probable phylogenetic relationships do appear among the species, however, and these will be discussed.

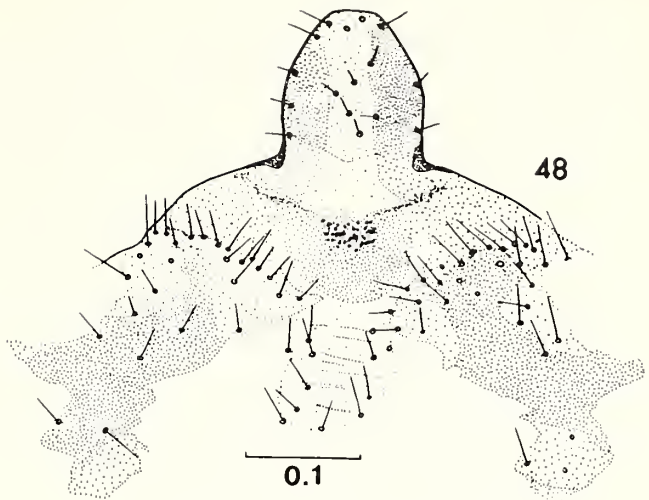
First, one must consider relationships to several species apparently outside of the group. *P. africanus* Enderlein and a closely related species tentatively identified as the males of *P. balli* by Badonnel (1969) show a wing marking pattern very similar to that described for most species of the *alboguttatus* group. These two species differ markedly, however, in male genitalic features (their females are presumably unknown) from any *alboguttatus*-group species. Both have a clunial comb of numerous denticles, and in both the principal endophallic sclerotizations form two lateral groups apparently not joined medially. The phallosome in general is not dissimilar in shape to that seen in most members of

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FIGS. 45–51. Female genitalic parts of *Peripsocus alboguttatus* group species. Fig. 45. *P. madescens* Walsh ♀, epiproct, (scale of Fig. 47). Fig. 46. *P. monticola* n.sp. ♀, epiproct, (scale of Fig. 50). Fig. 47. *P. potosi* n.sp. ♀, epiproct. Fig. 48. *P. australis* n.sp. ♀, subgenital plate. Fig. 49. *P. australis* n.sp. ♀, gonapophyses. Fig. 50. *P. monticola* n.sp. ♀, gonapophyses. Fig. 51. *P. monticola* n.sp. ♀, subgenital plate, (scale of Fig. 48).

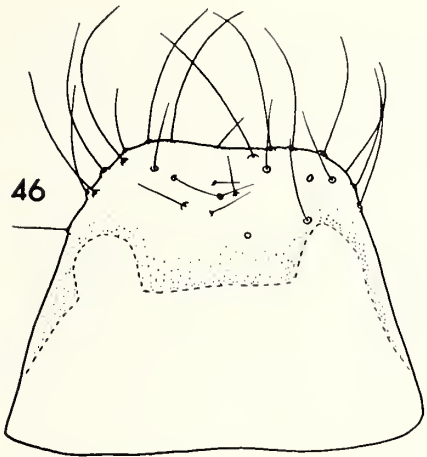


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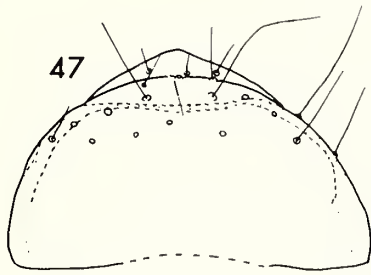


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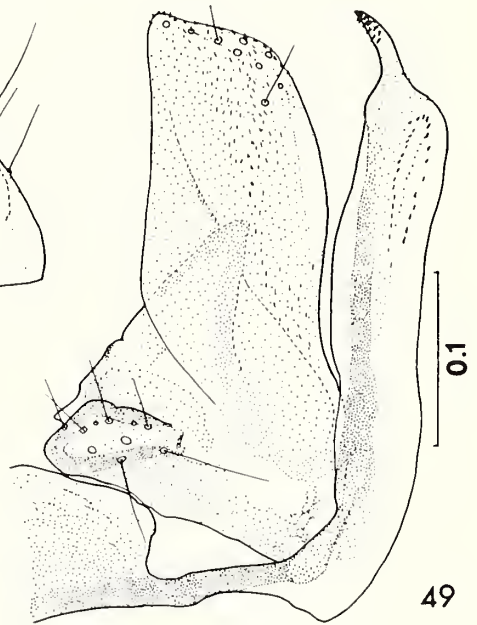


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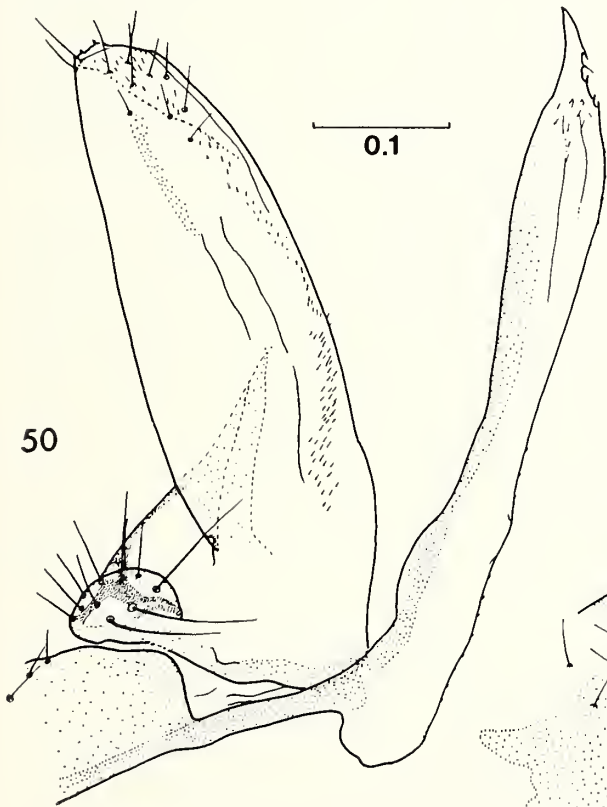
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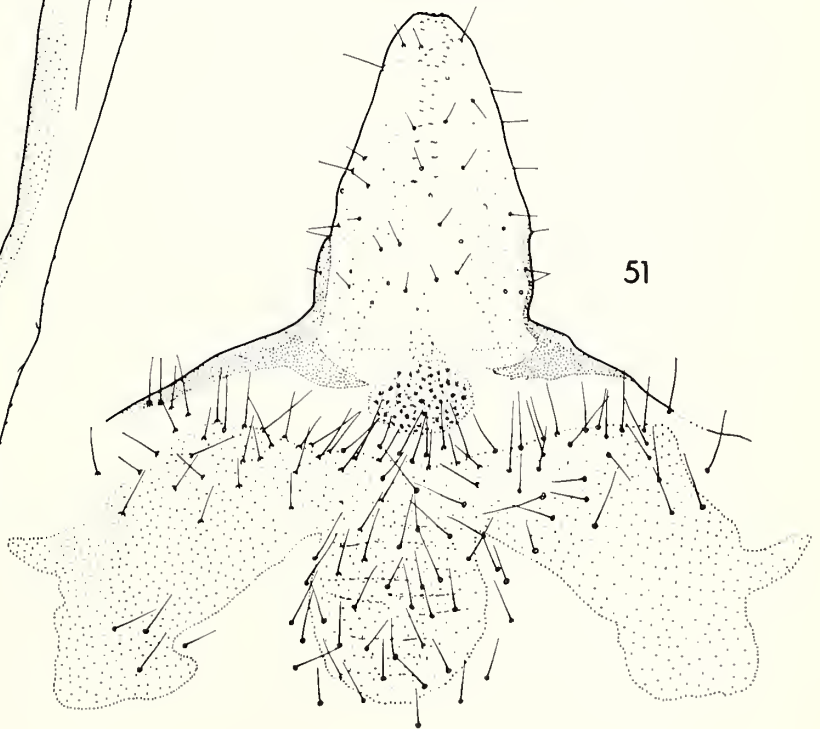
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the *alboguttatus* group. It would appear that these two species are not particularly closely related to any extant member of the *alboguttatus* group, but they may be rather close to the common ancestor of the group. In this case, the elaborate wing-marking pattern seen in most members of the group is probably primitive for the entire group.

Marked similarity is seen in structure of the female subgenital plate and gonapophyses between *P. monticola* and *P. quadripunctatus* Badonnel. The wing marking patterns of the two species are very different, and *P. quadripunctatus* does not share the extremely small size of third valvula with *P. monticola* and its close relatives *P. australis* and *P. balli*. One can suspect convergence in genitalic features in this case. Perhaps the problem can be solved if the male of *P. quadripunctatus* is found.

Apparently it is impossible to decide at present what species stand closest to the *alboguttatus* group, hence one cannot establish directions of evolution within the group. On the basis of morphology as well as geographic distribution, the southern cluster of species, *P. australis*, *P. balli*, and *P. monticola*, appears to represent one "end" of the group, while the northern species cluster including *P.alachuae*, *P. alboguttatus*, *P. maculosus*, *P. madescens*, and *P. minimus* seems to represent the other. Between these two clusters, *P. potosi* and *P. teutonicus* appear to be intermediates, the former species having a clearly intermediate distribution.

The southern species cluster appears to show a relictual distribution, with one species in southern Brazil, one in the Congo Republic, and one in a highland area of Jamaica. This suggests great antiquity for the cluster, but on the basis of female genitalic structure, which appears to be highly specialized for the genus, this cluster probably does not stand close to the primitive end of the species group.

Within the northern cluster, *P. madescens* and *P.alachuae* are apparently very closely related, the female genitalia being about the same in both, and these being the only two species in which the arms of the fork sclerite are decidedly curved. The other three species appear to be closely related among themselves.

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